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JOHN HENRY COMSTOCK, 1849-1931.
Portrait of 1884.

CONTENTS

Cole—Notes on the Ant Pogonomyrmex californicus, Buckley (Hym.: Formicidae) 113
Blaisdell, Sr.—A New Species of Phaleria from the Gulf Coast of Alabama (Coleop.: Tenebrionidae) 116
Rau—The Relation of the Size of the Cell to the Sex of the Wasp in Odynerus foraminatus Sauss. (Hymenopt. Vespidae) 119
Gamble—List of the Aquatic Beetles Taken in Presque Isle, State Park, Lake Erie, Pennsylvania (Coleop.: Dytiscidae, Haliplidae, Hydrophilidae, Gyrinidae) 122
Fernald—Some Old Letters. I. The Ways of a Wasp (Hymenoptera: Sphecidae) 124
Hood—Notes on Some New York Odonata 128
Donohoe—A Method of Preparing Grasshoppers for Pinned Specimens (Orthop.: Acrididae) 133
Tietz—Notes on a Few Night-flying Butterflies (Lepid.: Nymphalidae, Hesperiidae) 134
Entomological Literature 135
Review—Bremer & Kaufmann's Die Rübenfliege 139
Obituary—J. J. Joicey 140
Obituary—Dr. Reginald Heber Howe 140

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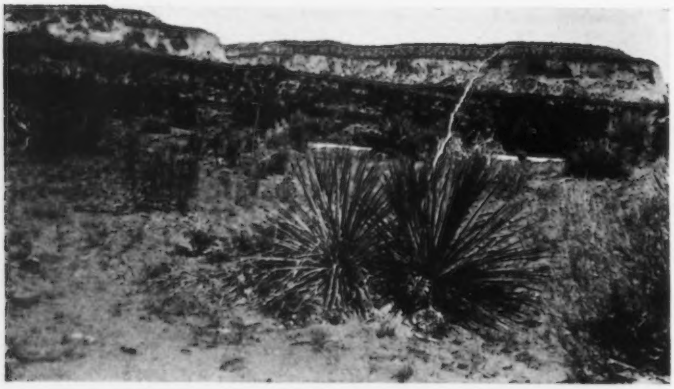

ANT, POGONOMYRMEX CALIFORNICUS.—COLE.

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Notes on the Ant Pogonomyrmex californicus, Buckley (Hym.: Formicidae).

By A. C. COLE, Jr., Ohio State University.

(Plate V.)

Pogonomyrmex californicus[1] is one of the most interesting species of the genus to which the well-known Occident ant (*P. occidentalis* Cr.[2]) belongs. Its habits are somewhat different from those of *occidentalis* yet the close relationship between the two species is distinctly noticeable.

DISTRIBUTION AND HABITAT.

Pogonomyrmex californicus is one of the more common ants of the southwestern desert states, especially California and Arizona. Wheeler[3] reports it from California, Texas, and Grand Canyon, Arizona; Miss Helen Green[4] from southern California; and the writer from the vicinity of Mojave and Needles, California, and Cameron, Arizona.

The ant nests exclusively, as far as is known, in sandy or pebbly soil of deserts. This accounts for its abundance in the Mojave and Painted Deserts of California and Arizona. Apparently it has never been found to construct nests on the "baked" areas[5] of deserts for it is probably unable to excavate the hard soil.[6].

[1] A description of this species is given by W. M. WHEELER, New agricultural ants from Texas. Psyche, IX (1902), 391.

[2] See MCCOOK, H. C., The Honey Ants of the Garden of the Gods, and the Occident Ants of the American Plains. J. B. Lippincott & Co., Philadelphia, 1882.

[3] WHEELER, W. M., Ants; their structure, development and behavior. Columbia Univ. Press, New York, 1926, p. 566. Also, IDEM, New agricultural ants from Texas. Psyche, IX (1902), 393, and, IDEM, The ants of the Grand Canyon. Bull. Amer. Mus. Nat. Hist., XXII (1906), 333.

[4] GREEN, HELEN E., Preliminary study of the ants of Southern California. Jour. Ent. and Zool., XXIII (1931), 25.

[5] These "baked" areas are bare flats which do not support vegetation. In the Mojave Desert they are seasonal lakes which have dried up.

[6] WHEELER, W. M., Ants; (1926), 190.

Wheeler [7] states that *californicus* is the most abundant and characteristic ant of the "warm desert zone" of the Grand Canyon which extends from the Angel Plateau to the banks of the Colorado River at the bottom of the canyon. The altitude, moisture and temperature of this lower zone are similar to those of the habitats of the ant in the desert south of the canyon.

In the typical habitats of the ant there is very little moisture and shade and an abundance of sunlight and high temperatures. The wind blows quite steadily over the Mojave Desert which greatly hastens evaporation. Shantz and Piemeisel [8] record the mean temperature of Mojave, California as 62.7 degrees over a period of 35 years and of Needles, California as 84.4 degrees for the mean maximum and 57.6 degrees for the mean minimum over a period of 23 years. The annual precipitation for Mojave is recorded as 4.86 inches over a period of 38 years and for Needles, 4.26 inches over a period of 28 years.

The following vegetation is typical of the desert areas occupied by nests of *californicus*: (Fig. 1).

Atriplex polycarpa (Torr.) S. Wats.
Covillea glutinosa (Engelm.) Rydb.
Opuntia spp.
Yucca mohavensis Sarg.
Phacelia sp.
Festuca octoflora Walt
Parosela spinosa (Gray) Heller
Franseria dumosa A. Gray
Sarcobatus vermiculatus (Hook.) Torr.
Aristida sp.

The Formicaries.

The nests, or formicaries, of *P. californicus* are often mere holes in the sand [9] with sand sometimes piled on one side. Wheeler [10] states that their nests are "low, flat craters from 6 inches to a foot in diameter with elegantly rounded slopes and slanting, usually somewhat eccentric entrances." This type of

[7] Idem, The ants of the Grand Canyon. (See footnote [3].)
[8] Shantz, H. L., and Piemeisel, R. L., Indicator significance of the natural vegetation of the southwestern desert region. Jour. Agr. Res., XXVIII (1924), 780 & 783.
[9] Wheeler, W. M., Psyche, IX (1902), 393.
[10] Idem, Bull. Amer. Mus. Nat. Hist., XXII (1906), 341.

nest is shown in Figure 2. The writer has found both types of formicaries and he is inclined to believe that the mound type is more characteristic of the Mojave Desert region.

The incipient mounds of *californicus* are small and fan-shaped and in their immature stages resemble those of *P. occidentalis* in the semi-desert regions. Wheeler [11] states that the deälated queens construct the incipient mounds in pure sand "which is also the substance in which the adult colonies are found."

The size of the colonies varies from one to a few hundred individuals.[12] Apparently they never approach the numerical strength of colonies of *P. occidentalis*. The workers make no attempt to clear away vegetation surrounding the nest. [13]

Harvesting Activities of the Ant.

Perhaps the outstanding activity of these ants is the harvesting of seeds from plants in areas adjoining the colonies. Apparently three of the chief seeds harvested are those of *Phacelia sp.*, *Aristida sp.* and *Sarcobatus vermiculatus*. The writer found these seeds in the chambers of most of the nests opened and the mounds were commonly surrounded with bracts of these and other seeds.

Harvesting activity in the Mojave Desert seems to be confined to the early morning and late evening hours. Many of the ants even work at night. During the heat of the day I found the entrances of all nests of *californicus* closed with sand or pebbles. When nests were opened under these conditions the ants were from one to a few feet below the surface where the soil temperature was noticeably lower.

Explanation of Plate V.

Fig. 1.—A section of the Mojave Desert, California. The two plants in the foreground are *Yucca mohavensis* Sarg. while a greater part of the vegetation in the background is composed of *Covillea glutinosa* (Engelm.) Rydb. Original.

Fig. 2.—A mound of *Pogonomyrmex californicus* Buckley on the eastern edge of the Mojave Desert, near Needles, California. The periphery of the mound is covered with husks from harvested seeds. The handkerchief serves to illustrate the relative size of the mound. Original.

[11] Idem, Ants, (1926), 190.
[12] *Ibid.*, p. 284.
[13] *Op. cit.*

A New Species of Phaleria from the Gulf Coast of Alabama (Coleop.: Tenebrionidae).

By FRANK E. BLAISDELL, Sr., Stanford Medical School and California Academy of Sciences, San Francisco, California.

The species belonging to the Tenebrionid genus *Phaleria* Latr., inhabit the sea-beaches of both the Atlantic and Pacific Coasts. The species described below is a new and interesting addition to those already known:

Phaleria lodingi, new species.

Form oval, depressed, narowing very moderately anteriorly and posteriorly to appear slightly subfusiform, about twice as long as wide. Color pale testaceous, except eyes and tips of mandibles which are black, head sometimes suffused with piceous. Pubescence minute, extremely sparse and inconspicuous. Surface microscopically reticulo-granulate, luster dull and the integuments thin and subdiaphanous.

Head about as wide as long, scarcely as wide as the pronotal apex, widest across the eyes, canthi not in the least prominent; sides before the eyes very feebly arcuate and convergent anteriorly, slightly and broadly sinuate at the oblique sutures, the latter feebly indicated and blackish; epistomal apex slightly arcuato-truncate, angles narrowly rounded; frons scarcely convex, extremely feebly and broadly impressed from side to side before the eyes, frontal suture obsolete, finely, very sparsely punctate, punctures more distinct than elsewhere. Labrum short and transverse, apex feebly arcuate, more strongly so laterally, sparsely and obsoletely punctate. Eyes large, transverse, moderately prominent and convex, rather coarsely faceted, emarginate at the anterior canthi, narrowly separated beneath. Antennae short, equal to the length of the pronotum at middle, not quite attaining the posterior third; joints two to five inclusive quite equal in width, second a little longer than wide, third obconical and about twice as long as wide, fourth and fifth subequal and about as long as wide; joints six to eleven inclusive incrassate, forming a six-jointed moderately compressed club; joints seven to ten equal in length and width, transversely oval, sixth slightly smaller, eleventh as long as wide, subovate, feebly narrowed apically, apex arcuate, equal to the tenth in width.

Pronotum at base about twice as wide as long and twice as wide as the head, transverse; apex evenly, not deeply, broadly emarginate between the obtuse angles; sides convergent from base to apex and feebly arcuate; base broadly arcuate and three-fourths wider than the apex, angles nearly rectangular and narrowly rounded; disk feebly and evenly convex, sparsely and

obsoletely punctulate, basal impressions feeble and punctiform to slightly elongate.

Elytra widest at middle, a little more than three times as long as the pronotum, a third longer than wide; sides broadly arcuate and continuing the line of the pronotal sides, obtusely rounded at apex, sutural angles obliquely rounded; base adapted to but not wider than the pronotal base, broadly and arcuately emarginate, humeri not in the least prominent or tumid; disk evenly and very moderately convex, with striae of small, feeble and unimpressed punctures that become obsolete in apical third, where the striae are stronger, slightly impressed and the intervals feebly convex, best observed under oblique illumination, interstrial spaces quite impunctulate. Scutellum small, equilaterally triangular and impunctate.

Under surface of the body glabrous and for the most part obsoletely punctulate; metasternum and abdomen very sparsely and feebly punctulate, punctules slightly larger on the fifth ventral segment; second and third segments subequal in length, fourth a little shorter. Prosternal process horizontal, smooth, obtusely narrowed apically and vertical posteriorly. Prosternum with a small, more or less distinct, shallow rounded pit at middle a short distance from the base of the process, at times evanescent.

Legs slender, femora not in the least inflated, flattened, protibiae moderately broadly and gradually dilated apically, triangulo-clavate in outline and briefly arcuate at base; meso- and metatibiae straight, widening but slightly toward apex; protarsi short and slightly stout, joints one to four subequal in length and width, the terminal quite equal in length to the preceding four; meso- and metatarsi long and slender, the latter about eight-ninths as long as their tibia. Abdominal segments differing in length in the sexes.

Male: A little narrower, fourth abdominal segment four-fifths as long as the third and two-thirds as long as the second.

Female: Broader. Fourth segment one-half the length of the second and about three-fifths as long as the third.

Measurements: (Types) Length 5-5.5 mm.; width 2.3-2.8 mm.

Holotype, male, No. 2954, and *allotype*, female, No. 2955, in the author's collection, Museum of the California Academy of Sciences. Collected by H. P. Löding, on the Gulf Beach at Mobile, ALABAMA. I take much pleasure in naming it after Mr. Löding.

Fourteen specimens studied, ten of which are *paratypes* distributed as follows: Four in each of the Author's, U. S.

National Museum and Mr. Löding's collections; two in that of Henry Dietrich of Lucedale, Mississippi.

The habitat of the species appears to be local as Mr. Löding states that he has taken it in but one place and always under or in the vicinity of dead fish.

Lodingi is more closely related to *gracilipes* Casey than to any other species. Specimens have been very carefully compared with the type of *gracilipes* by Drs. Buchanan and Chapin of the National Museum.

Dr. Buchanan states concerning *gracilipes* Casey: "It is a little shorter and relatively narrower, is darker brown, more shiny and less distinctly alutaceous than *lodingi;* the punctulation of pronotum, elytral intervals and venter is a little heavier. Regarding *lodingi* the paler color, more strongly developed alutaceous surface texture, duller luster and feebler punctulation may be in part due to immaturity. In *lodingi* the prosternum in front of coxae has a small pit or large puncture which is lacking in *gracilipes.* The prothorax of *lodingi* is a little broader relative to the length, and has sides slightly less arcuate than in *gracilipes.*"

Dr. Chapin remarks: "I am not certain whether I would call the two the same species. There is a difference in locality that may or may not be significant. Löding tells me that he finds these at but one place; that would indicate that the species is rather narrowly limited. So much for the side that the two are not the same. Against this, we have only the single type specimen of Casey's species. There is no way to tell how much his species varies. Perhaps they are the same—I really doubt it."

According to Col. Casey's remarks *gracilipes* is very narrow, smallest and by far the most slender species with elongate metasternum, allied only to *debilis* Lec. The type of *gracilipes* measures 4.5 mm. in length and 1.9 mm. in width, and was collected by Mr. W. Julich in Texas, (supposedly on the sea beach, although not so stated).

In closing Mr. Löding says that "the pale color of *lodingi* is not due to immaturity, as all of the specimens that he has collected have been of the same color." It belongs to the group of species in which the margins of the thorax and elytra are not fimbriate.

The Relation of the Size of the Cell to the Sex of the Wasp in Odynerus foraminatus Sauss. (Hymenopt.: Vespidae).

By PHIL RAU, Kirkwood, Missouri.

This wasp[1] nests in hollow twigs and ready-made burrows. The discovery of one of these nests at just the right time enabled me to make the following notes.

The nest was in a hollow twig ten inches long, and the opening was plugged with mud. There was a 1½ inch vestibule near the plug, but this was merely an exaggeration of the double wall usually found between the cells. These spaces,[2] in my opinion, serve as insulation from the extreme weather changes for the immature insect, although Roubaud thinks they serve to confuse the parasites. This twig was one which had been hollowed out by some other insect and served nicely the purposes of the present occupants. It was one of about fifty tied together in a bundle and hung out-of-doors, vertically, just for the purpose of luring such insects as these to kindly use them in my own back yard and thus save me a trip afield.

The cells placed in the tube from the bottom up were measured and the sex of the occupant determined when they became mature.[3] It is interesting to note that only the two bottom

No. from Bottom	Size of Cell, Inches	Sex	Condition	Size of Air-space Above
1	1	♀	Pupa face pigmented	¼
2	¾	♀	Fully pigmented, and wings in early stage of inflation	⅛
3	⅜	♂	Completely developed adult	¼
4	½	♂	Completely developed adult	¼
5	½	♂	Completely developed adult	¼
6	⅜	♂	Completely developed adult	⅜
7	½	♂	Dead small larva	⅜
8	⅜	♂	Pupa pigmented, no wing inflation	¼
9	½	♂	Younger; only slightly pigmented	7/16
10	½	♂	Very white	3/16

The space between the last cell-plug and the outside plug (the vestibule) was 1½ inches in length.

[1] Identified by Dr. Grace Sandhouse.

[2] The air spaces varied in size from ⅛ inch to 7/16 inch (see table).

[3] The technique was carefully to split the tube, and cover the occupied portion with strips of celluloid or cellophane, secured by adhesive tape.

cells contained females and were from ¾ to 1 inch in length, while all of the upper eight cells contained males and were only ⅜ to ½ inch in length.

This nest was taken and examined on July 29, 1930, and shows an interesting state of affairs in regard to development and emergence. Even though the eggs of the females had been the first deposited, they were in a more backward state of development than the males in the four cells above them. The males in cells 3, 4, 5 and 6 were fully developed and ready to emerge, and were undoubtedly waiting for the inmate in cell 7 to make way for their emergence by getting out itself. But unfortunately, the occupant in cell 7 had died, and since this one had failed to open its portion of the channel, all below it were imprisoned.

The reason for slower development in the females than in the males as shown by the first six cells is a physiological one as well as biological. The females, even though the eggs had been deposited first, were not the first to be ready to emerge. This was probably due to the larger size to which they must grow, plus the maturation of the ova; the males, being smaller, had less tissue to build and therefore matured in less time. From the behavioristic point of view, the males needed to be on hand early to fly forth and find females of other colonies.

While the males in cells 3, 4, 5 and 6 were adult and waiting to flee when the twig was cut, it does not necessarily mean that all of them had become adult simultaneously. It probably means that they became adult one by one in direct relation to the time when the eggs had been deposited, and merely waited quietly for the younger brothers between them and the door to become mature and break down the walls. In cells 8, 9 and 10, containing male pupae in various stages of development, the uppermost and youngest was a very white pupa, the next slightly pigmented, while the one below was wholly pigmented and very mummy-like; which indicates that they develop in order of oviposition.

Does the entire line wait for the youngest wasp to become

adult and start the emerging procession? Also when one such accident occurs as a dead wasp in the middle of the line, does the catastrophe of entombment result? Or are they capable of modifying their usual behavior to suit the needs of an emergency?

In order to test the method of emergence in this case, the two portions of the twig were put together with adhesive tape and placed in an upright position in a dark box. Two days later I discovered that the two lowermost wasps had attained adulthood and they along with males in cells 3 and 4, had bitten a hole through the center of each double plug and in the doorway, and had escaped to the floor of the box. It seems clear that the imprisoned wasps did not wait for the young males above them to clear the way, but probably the females below them, when they became full-grown, took the initiative and the males followed. This seems more likely, because the females are larger and have more powerful jaws. They, on whose energy the race depended, wasted no time in loafing, but worked upward and onward, bringing freedom to those who should have opened the way for them. The females alone were physically fit and physically capable to bite through the several walls.

It is surprising that in this abnormal process of liberation none of the infants in the upper rooms were disturbed or pushed to the bottom. They kept their places in each cell, and even though these adults crowded past them, none were injured, and all eventually reached maturity.

Of course the facts are interesting in themselves, and especially the fact that the large cells contained females and the small cells males, but it adds nothing in answer to the vexing problems of whether the mother knew something about the sex of each egg, and provided food and space according to the occupancy of one or the other sex. It seems almost too much to grant them sufficient foresight to do that sort of thing, but twenty years in the field with these insects have taught me to expect the unexpected, and not to be surprised at new wonders as they crop up from day to day.

List of the Aquatic Beetles Taken in Presque Isle, State Park, Lake Erie, Penna.* (Coleop.: Dytiscidae, Haliplidae, Hydrophilidae, Gyrinidae).

By JOHN T. GAMBLE, Thiel College, Greenville, Pennsylvania.

Presque Isle State Park, located on a peninsula extending into Lake Erie at Erie, Pennsylvania, is one of the most unique ecological situations to be found in the United States. The peninsula is a compound, recurved sand-spit which,[1] as its name implies, is almost insular in its aspects. Due to constant changes in its topography it presents a remarkable series of aquatic habitats. These consist of series of ponds and marshes, separated by forest and sand dune areas, ranging along its entire length in a more or less chronological sequence. The ponds near the neck of the peninsula are several hundred years old and from these, extending toward the outer extremity of the sand-pit, there is a succession of ponds of various ages, sizes and shapes terminating in recently formed beach pools.

While engaged in field studies on the peninsula at the University of Pittsburgh Lake Laboratory the writer was impressed by the abundance of the aquatic beetles in the various ponds, which seemed to present almost every type of still water situation. From 1926 to 1931 a concentrated effort was made to determine the species of aquatic Coleoptera to be found on the peninsula and also to ascertain, as far as possible, the various factors involved in the distribution of these species in the numerous ponds.[2] The latter studies were made as a contribution to a general study of the life and distribution of animals on the peninsula by the Zoology staff [3] at the Lake Laboratory.

After completing the survey of species the writer was so impressed by the number of genera and species from such a restricted area, that he made a comparative study of species

* Contribution from the University of Pittsburgh Lake Laboratory.

[1] JENNINGS, O. E. "A botanical survey of Presque Isle, Erie County, Pennsylvania." *Ann. Car. Mus.*, Vol. V, Nos. 2 and 3, 1909.

[2] GAMBLE, J. T. "Studies on the ecology and distribution of aquatic beetles of Presque Isle, Lake Erie, Pennsylvania". *Proc. Penna. Acad. Science*, Vol. V, 1931.

[3] WILLIAMS, S. H. "Preliminary report on the animal ecology of Presque Isle, Lake Erie, Pennsylvania." Loc. cit.

abundance with lists from nearby states. A list of the species of aquatic coleoptera collected on Presque Isle and a table showing the relative abundance of genera and species as compared with New York and Indiana, is as follows:

DYTISCIDAE

1. *Hydrocanthus iricolor* Say
2. *Laccophilus maculosus* (Germ.)
3. " *proximus* Say
4. " *undatus* Aube
5. *Hydrovatus pustulatus* Melsh.
6. *Desmopachria convexa* (Aube)
7. *Bidessus affinis* (Say)
8. " *flavicollis* Lec.
9. " *granarius* (Aube)
10. " *pulicarius* (Aube)
11. " *suburbanus* Fall
12. *Coelambus dispar* Lec.
13. " *impressopunctatus* (Schall)
14. " *nubilus* Lec.
15. " *turbidus* Lec.
16. " *inaequalis* (Fab.)
17. " *laccophilinus* (Lec.)
18. *Hydroporus dichrous* Melsh.
19. " *niger* Say
20. " *clypealis* Sharp
21. " *consimilis* Lec.
22. " *undulatus* Say
23. " *melsheimeri* Fall
24. " *striola* Gyllenhal
25. *Celina angustata* Aube
26. *Copelatus glyphicus* (Say)
27. *Agabetes acuductus* (Harr.)
28. *Agabus aeneolus* Crotch
29. " *confinis* Gyll.
30. " *punctatus* Melsh.
31. " *semivittatus* Lec.
32. " *seriatus* (Say)
33. " *scapularis* Mannh.
34. *Ilybius biguttulus* (Germ.)
35. " *confusus* Aube
36. " *ignarus* Lec.
37. " *oblitus* Sharp
38. *Matus bicarinatus* (Say)
39. *Coptotomus interrogatus* (Fab.)
40. *Rhantus binotatus* Harr.
41. " *bistriatus* (Bergst.)
42. " *flavogriseus* Crotch
43. *Colymbetes sculptilis* Harr.
44. *Hydaticus piceus* Lec.
45. *Graphoderes cinereus* L.
46. *Thermonectes basilaris* (Harris)
47. *Acilius semisulcatus* Aube
48. " *mediatus* (Say)
49. *Dytiscus harrisi* Kirby
50. " *fasciventris* Say
51. " *hybridus* Aube
52. " *verticalis* Say
53. *Cybister fimbriolatus* (Say)

HALIPLIDAE

54. *Peltodytes duodecimpunctatus* (Say)
55. " *muticus* Lec.
56. *Haliplus borealis* Lec.
57. " *fasciatus* Aube
58. " *immaculicollis* Harr.
59. " *triopsis* Say

HYDROPHILIDAE

60. *Helophorus linearis* Lec.
61. " *lineatus* Say
62. " *nitidulus* Lec.
63. *Hydrochus inaequalis* Lec.
64. *Sphaeridium scarabaeoides* L.
65. *Cercyon pygmaeus* Illig.
66. " *tristis* Illig.
67. *Paracymus subcupreus* Say
68. *Hydrobius fuscipes* L.
69. " *melaenus* Germ.
70. *Anacaena infuscata* Motsch.
71. *Enochrus cinctus* Say
72. " *hamiltoni* Horn
73. " *ochraceus* Melsh.
74. " *perplexus* Lec.
75. *Helocombus bifidus* Lec.
76. *Chaetarthria pallida* Lec.
77. *Tropisternus glaber* Lec.
78. " *lateralis* F.
79. " *mixtus* Lec.
80. *Hydrophilus obtusatus* Say
81. *Hydrous triangularis* Say
82. *Berosus peregrinus* Herbst
83. " *striatus* Say

GYRINIDAE

84. *Dineutes assimilis* Kirby
85. " *emarginatus* Say
86. " *horni* Roberts
87. *Gyrinus aeneolus* Lec.
88. " *limbatus* Say
89. " *minutus* F.
90. " *pectoralis* Lec.
91. " *piceolus* Blatch.

Comparison of the aquatic coleopterous fauna of Presque Isle with that of the states of Indiana and New York.

	Dytiscidae		Hydrophilidae		Haliplidae		Gyrinidae	
	Gen.	Spec.	Gen.	Spec.	Gen.	Spec.	Gen.	Spec.
Presque Isle[1]	22	53	14	24	2	6	2	8
Indiana[2]	24	70	20	54	2	10	2	15
New York[3]	26	129	25	88	2	17	2	31

Both the Indiana and New York lists include pond, stream and terrestrial representatives of the various groups, while the Presque Isle list (with 2 or 3 exceptions) includes only pond forms.

Some Old Letters.

By H. T. FERNALD, Orlando, Florida.

I. The Ways of a Wasp (Hym.: Sphecidae).

.....Pa., Sept. 3, 1898.

Dear .....:

I have recently had an experience in which I am sure you will be interested and am therefore writing you somewhat at length about it.

Before I really begin, let me say that in order to make certain actions which I shall describe, stand out more clearly, I shall also explain them in such terms as would hold, I think, if it were a person concerned rather than a wasp. But I do not thereby commit myself even for a moment to the position that these explanations would hold for the wasp. In fact, who can with any certainty account for the actions of a wasp? We explain such actions in terms of our own mentality but they may be totally different, from the standpoint of the wasp.

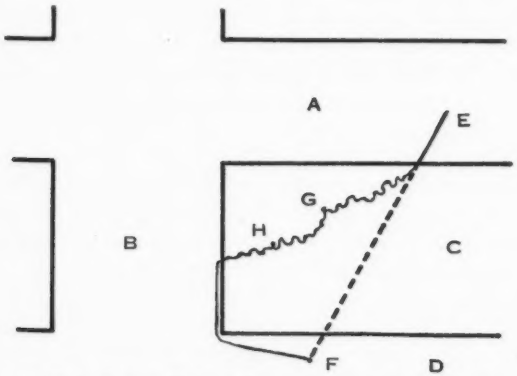
A few days ago, early in the afternoon, I was walking along a path near my house when I saw, almost at my feet on the walk, a small digger wasp dragging along a caterpillar which either was or closely resembled that of a nearly full-grown cabbage butterfly. The walk, which was about five feet wide, was made of soft coal ashes (cinders) and while somewhat trodden down was nevertheless rather rough and loose, partic-

[1] From preceding list.
[2] From Blatchley, "Coleoptera of Indiana."
[3] From Leonard, "Insects of New York."

ularly toward its sides, which made the dragging rather hard for the wasp which was only about three-quarters of an inch long, and which later proved to be *Ammophila urnaria* (Dahlb.).*

The wasp, when first seen, was astride the body of the caterpillar, dragging it along in the manner so delightfully described recently by the Peckhams in their book with which I know you are familiar.

After a time the insect seemed to tire of this method, for it let go of the caterpillar and, grasping its head, backed off dragging the caterpillar after it. This proving unsatisfactory or tiresome, however, it shortly resumed its first position.



A, Walk; B, Cross Walk; C, Grass; D, Road; E, Where wasp was first seen; F, Hole; G, H, Where the wasp climbed up the grass; EF, Direct line to hole; EGHF, Approximate path of wasp.

The path of the wasp was obliquely across the walk, at the side of which was a grass strip about seven feet wide, separating the walk from a carriage road also made of cinders, well packed by passing wheels except for about two feet near the grass, where, as this part was little used, it was quite loose. A few feet beyond the wasp a cross walk ran from the main one on which the wasp was, to this road. It was evident that if the wasp maintained the direction she was taking across the

* Now *Sphex arvensis* (Dahlb.).

walk she would enter the grass and reach the road before coming to the cross walk.

Forgetful of everything else I watched that wasp, as she tugged and strained, dragging her burden along and finally entered the grass. Here, however, difficulties unforeseen appeared. The grass stems were quite close together and about four inches high, the lawnmower not having been over that place for some time. Under these conditions the wasp was dragging her burden through what, to her, was a dense forest, with the trees growing close together, to add to the difficulty of her task. No wonder then, that her path, at first as straight as could be expected under the circumstances, became more winding as she dragged the caterpillar between the grass stems seeking for the easiest way and finally led in quite a different direction from that first taken. That she seemingly realized this may be why she let go of the caterpillar and climbed to the top of a grass stem (I almost wrote it—tree). Here her head could be seen turning slowly from side to side for about a minute. Then she descended, grasped the caterpillar and started off, this time practically on her course again.

But the same difficulties as before were present. She was still less than half way across the strip of grass and after a time she again began to stray. To overcome this difficulty the same method as before was adopted. Another grass stem was climbed and from its top the wasp again viewed the scenery!

At this point in her wanderings the wasp had strayed so far from her original direction that she was nearer to the cross walk than to the road which she seemed to have been heading for, and if human interpretation of her next acts may be accepted, she decided that the best thing to do would be get out of the grass. Accordingly she went down and picked up the caterpillar, but this time, instead of resuming her original direction, she headed for the nearest clear place, the cross walk, and after some effort reached it about a foot from where it joined the road. Dragging, half carrying the caterpillar, she hurried along the side of the walk close to the grass, turned the corner and went along the road toward where her original line of march would have brought her, and about a foot out from the

grass. Arrived at the line of her original march she laid down the caterpillar and began hunting over an area eight or ten inches in diameter. Then spying a small, thin piece of slate evidently from the roof of a recently constructed building near by, she went to it, pushed it to one side, and beneath it was a hole! She had reached her goal.

And now to dispose of her prey. Pulling the caterpillar near the mouth of the hole the wasp now placed her antennae in the opening, pressing them against its sides; then withdrawing them, placed them on opposite sides of the caterpillar, after which she repeated the process. The human intellect would assume she was measuring to see if the caterpillar was too large for the hole. What the wasp thought, who can tell? Her next act was to step astride the caterpillar, pick it up and start down the hole. But here a difficulty appeared: the hole was large enough for the caterpillar or for the wasp, but not for the two together. After a brief struggle the wasp backed out of the hole —she did get her head part way in—and for a third time repeated her seemingly measuring movements with her antennae. Then followed a pause. Would she enlarge the hole; give it up altogether; or what would happen? After a few moments of absolute quiet she drew the head of the caterpillar close to the hole, which she then entered herself. Reappearing a moment later, heading outward, she reached out, grasped the caterpillar and backed down out of sight, dragging the caterpillar after her.

At this point I became fearful that the wasp might escape and so when it came out about a minute later it found itself in a cyanide bottle. I therefore lost any opportunity of seeing what would happen afterward such as the process of filling the hole, the possible pounding down of the earth with a stone, or the various actions chronicled by different observers.

The hole was between three and four inches deep, sloping obliquely downward, slightly greater in diameter in its lower third, and here I found the caterpillar with an egg attached to its side at about the fourth segment behind the head.

How to account for the remarkable actions of this wasp is a problem unless the fact that it (and probably several gen-

erations preceding) lived on a college campus be considered. If its mental activities were in some way affected by the intellectual atmosphere present there, an explanation, perhaps, is found!

I shall not publish this account at present for I feel sure it would not be believed. I do feel confident, though, that observations during the next quarter-century will bring to light such remarkable actions by wasps that by that time this description of my observations will be much more acceptable than now.

Yours sincerely,

Notes on Some New York Odonata.

By J. Douglas Hood, University of Rochester, Rochester, New York.

The dragonfly is worthy game, whether sought with the net, the camera, or, as advocated by a recent contributor to one of our leading sporting magazines, with the rifle loaded with shot cartridges.* As an adjunct to the fly-rod, the insect-net has been in New York for several years my constant companion, and pleasant days on Adirondack streams have owed much of their pleasure (and frequently most of their profit!) to the net rather than the rod. A few of the observations made at such times and others, together with certain distributional records which have seemed worth while, form the contents of this paper.

Calopteryx amata Hagen. This strong-flying dragonfly, recorded in New York only from Franklin and Essex counties, is common along the Little River near Oswegatchie, N. Y., where it seems to frequent the mouths of the numerous cold spring-runs. It is more wary than its congener *C. maculata,* and consequently much more difficult to capture. Its flight is more direct and not as fluttering, and when hawking along the stream margins it may frequently be mistaken for a gomphine. Specimens have been collected from June 17 to July 27.

The male in courting frequently flutters poised in front of

* Burton, Lester A., "A Shootin' Yarn", Field and Stream, 1932, No. 9, p. 46 (Dec., 1931).

the seemingly disinterested female, usually alight on an alder leaf over the water, for a full thirty seconds, moving only a few inches away during the entire period.

LESTES INAEQUALIS Walsh. In the New York state list of insects,* Needham records this species from Staten Island only, where it was taken in June and July by William T. Davis.

About Rochester it is not uncommon in certain years. In 1929 it was frequently encountered at Sodus Bay (Wayne Co.), where in the previous year only its congener *vigilax* was taken. In 1928 it appeared to be the commonest large Lestes at Long Pond (Monroe Co.). The dates of capture range from June 19 to July 19.

ENALLAGMA ANTENNATUM (Say). This is one of the dominant species along the old and abandoned Erie Canal at Wayneport, N. Y. Specimens were taken in numbers July 25. It is one of our rarer Enallagmas having been recorded in the State only from St. Lawrence, Essex, and Tompkins counties.

OPHIOGOMPHUS CAROLUS Needham. My experience with this species in the field is not at all in agreement with that of Needham, who says (Bull. 47, N. Y. State Mus., p. 439; 1901), "Few imagos have been taken at large, and, indeed, they are rarely met with"; and also (Can. Ent., 29: 183; 1897), "It was easy to collect the nymphs by hundreds in April, and in May the banks of the waters they frequented were fairly covered with exuviae. Yet, outside of my breeding cages I saw but one live imago, notwithstanding I was doing much collecting at all times and in all places considered favorable. Where were they?"

Along Willseyville Creek and Six-mile Creek, in Tompkins County, this was the commonest dragon-fly in June, 1926. In the riffles it was the exception to find an unoccupied boulder; and frequently a larger boulder would serve as a resting and reconnoitering station for two or three individuals. Long series of males (and one female) were taken in the period between June 16 and June 28.

The answer to Needham's question is that after emergence

* Leonard, M. D., *et al*, "A List of the Insects of New York, with a List of the Spiders and Certain other Allied Groups", Mem. 101, Cornell Univ. Agr. Exp. Sta.; 1928.

this dragonfly, probably like all others, leaves the vicinity of the body of water in which the nymphal life was passed and remains away until the wings and integument are fully hardened and until sexual maturity brings them back to the water for the purpose of mating and egg-laying. Did dragonflies not habitually do this, the competition for food would be extreme, especially where many thousands emerge along each few hundred feet of shore line.

The emergence of our dragonflies from the warming waters begins in the spring with *Anax junius* and *Ischnura verticalis*, the first forms to be seen on the wing in this latitude. The transformation of the numerous species is continued throughout the summer, until August and September bring out from the water the last of the aeshnas and sympetrums. In this orderly cycle, many cordulines follow most of the Zygoptera and the libellulines precede the large aeshnas. The number produced is astonishing. From each foot of shore line in suitable bodies of water many dozens of individuals take wing. One year Mr. E. A. Maynard, one of my colleagues, found at Conesus Lake, on each of two successive nights, an average emergence of five *Epicordulia princeps* to each linear foot of shore; and yet this species is never abundant over the water, and is only one of nearly a score of species to complete its transformation among the rushes and flag which border most of the lake. Did every individual of all the species remain in the vicinity of its nymphal home, there would scarcely be flying room for them, and of food almost nothing at all.

Ophiogomphus carolus emerges in May, according to Needham, and several weeks apparently elapse before its return in sufficient numbers to be noticeable.

It is a beautiful insect, with the ground color of matured males bright grass-green, and the spots on abdominal tergites 7-10 and the terminal appendages yellow. The median spots on the basal tergites are decidedly greenish. Reared individuals never attain this full coloration, which is much brighter than that described by Needham.

OPHIOGOMPHUS RUPINSULENSIS (Walsh). Recorded in the state from Tompkins, Schoharie, and Sullivan counties, this has been taken at Lakeville (on Conesus Lake), June 3, 1928

(1 ♂, just emerged), by E. A. Maynard; and at Cranberry Lake, on the Oswegatchie River, Aug. 4, 1926 (1 ♀), by the writer. I have seen it also at Oswegatchie, on the Little River, resting on inaccessible boulders in midstream.

LANTHUS ALBISTYLUS (Hagen). Early in August, this is easily the commonest dragonfly along the Oswegatchie River, a mile or so below Cranberry Lake where the water comes over a log chute. In the state it has been recorded only from the "Ramapo Mts., close to [New Jersey] state line."

BOYERIA GRAFIANA Williamson. The state list of insects records this species from Herkimer, Greene, and Orange counties. I have taken it at Oswegatchie, along the Little River, August 28 and 29, 1930 (2 ♂ ♂).

HELOCORDULIA UHLERI (Selys). Frequents the shady nooks between large boulders and beneath trees along the margin of the Little River, near Oswegatchie, N. Y., in late June and early July, flying throughout the day. Though it explores the shade rather deliberately, I have found it difficult to capture, apparently because it flies close to the water's surface. Three specimens only were taken in two days of watchfulness (July 2 and 6, 1931).

CORDULIA SHURTLEFFI Scudder. Two males were taken at Mud Pond, on the Lloyd-Cornell Reservation near McLean, in Tompkins Co., N. Y., July 14 and 26, 1926, and the species is thus an addition to the list known from that area. This, too, is the only record for Tompkins Co., I believe.

SOMATOCHLORA ELONGATA (Scudder). One male of this species was taken on the Oswegatchie River near Oswegatchie, N. Y., August 3, 1926. In the state it has heretofore been recorded only from Ithaca.

SOMATOCHLORA TENEBROSA (Say). This is an abundant dragonfly in Bergen Swamp, Genesee Co., during at least the latter half of July. Both sexes have been taken in numbers.

SOMATOCHLORA WALSHII (Scudder). This is likewise common in Bergen Swamp, Genesee Co., where specimens of both sexes have been taken July 17 and 25. From Oswegatchie, St. Lawrence Co., I have one male taken August 3, 1926.

SOMATOCHLORA WILLIAMSONI Walker. Needham records this in the state list from Saranac Inn (Franklin Co.) and Fair

Haven, on Lake Ontario (Cayuga Co.). I have it from Sodus Bay (Wayne Co.), September 10 (1 ♂) and September 11 (1 ♀), 1925; from Adirondack Lodge (Essex Co.), August 5, 1926 (5 ♂), where it is common about Clear Lake (sometimes called Heart Lake); from Cranberry Lake (St. Lawrence Co.), August 4, 1926 (1 ♂); and from Rochester (Monroe Co.), July 31, 1928 (1 ♂), Grace L. Murray.

NANNOTHEMIS BELLA (Uhler). This, our smallest dragonfly, is very abundant in Bergen Swamp, Genesee Co., where, however, it apparently confines itself to a small area of marl near the middle of the swamp. The water is there only a few inches deep. Males fly actively on inconspicuous wings, looking like animated patches of bluish down; while the females are more likely to be found resting quietly on the low grass about the water's edge. Dozens were taken between June 25 and September 2, by Richard C. Hart, Grace L. Murray, and myself.

E. B. Williamson says in a recent letter, "I've seen it alive only a few times—always in Indiana."

In New York, Needham records it in the state list from Mt. Marcy (the highest peak of the Adirondacks, in Essex Co.), from New York City, and from Staten and Long Islands.

SYMPETRUM CORRUPTUM (Hagen). New York records of this species are confined to Rochester, Buffalo, and Staten Island. I have one male taken at Ithaca, July 8, 1926.

SYMPETRUM COSTIFERUM (Hagen). In 1926 this species was abundant at Ithaca, around the ponds on the fish-hatchery grounds, where it had formerly never been found. Quite evidently it is new to that region, as Dr. Needham and his classes could not possibly have overlooked it. At the Lloyd-Cornell Reservation, near McLean, N. Y., I also took one male August 30, 1925. Davis has taken the species frequently on Long Island; but in other parts of the state it appears to be rarer, having been recorded only from Franklin and Erie counties.

SYMPETRUM DANAE (Sulzer). This species has not previously been recorded from New York State. At Bergen Swamp (Genesee Co.) I took one male on August 25, 1930, flying over the marl beds, which are located deep in the swamp. Careful search on later visits proved fruitless, however.

A Method of Preparing Grasshoppers for Pinned Specimens (Orthop.: Acrididae).

By Heber C. Donohoe, Bureau of Entomology,
U. S. Department of Agriculture.

Many Acrididae, particularly gravid females, are of such large size that to make satisfactory pinned specimens the internal organs must be either removed and replaced, or treated to prevent collapse of the body walls and ultimate decay.

Two methods are commonly employed. The specimen may be slit ventrad the length of the abdomen, the entire body contents removed, and the cavity stuffed with cotton. Likewise, it may be injected *in toto* with melted paraffin while held submerged in a bath of warm water.

The writer has employed both of these methods with unsatisfactory results. Stuffed specimens offer favorable conditions for entrance and breeding of museum pests. Furthermore, the abdominal walls of specimens so prepared are thin and papery and are easily torn and shattered.

With the paraffin-injection method, besides the inconvenience of manipulating a syringe containing hot paraffin, injected specimens are so heavy that they slip on their pins, become readily dislodged and broken, and are a constant danger to other materials pinned in the same case.

The method finally adopted embodies parts of each process and gives excellent results.

The first eight abdominal sterna are slit mediad, and the entire thoracic and abdominal contents are removed with a pair of curved forceps. At this stage the specimen is pinned. Next a bit of absorbent cotton is rolled and carefully moulded to fit the entire body cavity, and is inserted, first cephalad into the cervix and thorax, then caudad to the tip of the abdomen. The final step consists of painting melted paraffin over the cotton exposed at the slit by means of a fine camel's-hair brush. The paraffin, rapidly absorbed by the cotton, forms a light, solid core. As the paraffin begins to solidify, the edges of the

incision may be pressed together and given an additional light coat of paraffin externally to seal the cut.

The result is a light, firm specimen showing no body openings for the admittance of museum pests and resistant to such invaders should they gain entrance by other means. Such specimens are easily and quickly prepared, retain their normal shape indefinitely, and pin well in cases.

The grade of paraffin to use must be determined by the maximum temperature to which the specimens will be exposed. In regions of extreme summer heat a paraffin of higher melting point must be used than in cooler regions.

In addition to Acrididae, the writer has employed this method to a slight extent for Tettigoniidae and the tarantula *Eurypelma californica* Auss., with highly satisfactory results. Its application should be equally successful for the preparation of all large, soft-bodied arthropods.

Notes On a Few Night-flying Butterflies (Lepid.: Nymphalidae, Hesperiidae)

In looking over my field notes and specimens, I find the following records which may be of interest to those collecting data on the night flight of diurnals.

Vanessa atalanta Linn.—Taken at Richmond Hill, Long Island, New York, July 16, 1915, at night, at sugar.

Vanessa atalanta Linn.—Taken at State College, Pennsylvania, on July 24, 1930, in a light trap.

Vanessa cardui Linn.—Perfect specimen taken at State College, Pennsylvania, August 22, 1931, in a light trap.

Thorybes bathyllus S & A—Taken at Clemson College, South Carolina, between July 10-15 in a light trap operated by Mr. Cartwright. Specimen was sent to me for identification with other light trap captures.

I believe that when butterflies do fly at night they are more often stimulated by light than by baits.—HARRISON M. TIETZ, Dept. Zoology, Pennsylvania State College, State College, Pennsylvania.

Entomological Literature

COMPILED BY LAURA S. MACKEY UNDER THE SUPERVISION OF E. T. CRESSON, JR.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

The **figures within brackets** [ ] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of ENTOMOLOGICAL NEWS for 10c. The number of, or annual **volume**, and in some cases the part, heft, &c. the latter **within** ( ) follows; then the pagination follows the **colon** :

All continued papers, with few exceptions, are recorded only at their first installments.

*Papers containing new forms or names have an * preceding the author's name.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

☞*Note the change in the method of citing the bibliographical references, as* **explained above.**

Papers published in the Entomological News are not listed.

GENERAL.—Brues & Melander.—Classification of Insects. [Bull. Mus. Comp. Zool. Harvard Coll.] 73: 672 pp., ill. **Carr, W. H.**—Adventures with trailside insects. [15] 195-206, ill. **DeLong, D. M.**—Some problems encountered in the estimation of insect populations by the sweeping method. [7] 25: 13-17. **Hamlin, J. C.**—An inquiry into the stability and restriction of feeding habits of certain cactus insects. [7] 25: 89-120, ill. **Larson & Hinman.**—A list of insects collected in moss and lichens on oak trees near Corvallis, Oregon. [10] 34: 43-44. **Lutz, F. E.**—Our ignorance concerning insects. [4] 64: 25-29, cont. **Maheux, G.**—Le mecanisme des epidemies d'insectes. [98] 59: 59-72, ill. **McAtee, W. L.**—Effectiveness in nature of the so-called protective adaptations in the animal kingdom, chiefly as illustrated by the food habits of Nearctic birds. [Smiths. Miscell. Coll.] 85: 201 pp. **Poulton, E. B.**—A hundred years of evolution. [Rep. Brit. Assoc. Advance. Sci.] 1931: 71-95, ill. **Scheerpeltz, O.**—Insekten in schnee und eis. [Der Naturf., Berlin] 8: 414-421, with plate. **Tavares, J. S.**—In Memoriam. [Brotéria] 1: 9-34. **Turner, H. J.**—Nomenclature. [21] 44: 40. **Van Duzee, E. P.**—The new entomological laboratory of the California Academy of Sciences. [55] 8: 97-101, ill. **Van Duzee, E. P.**—Numbering types. [55] 8: 101. **Weiss, H. B.**—John Pointer's collection of insects. [6] 40: 95-97.

ANATOMY, PHYSIOLOGY, ETC.—Abbott, C. E.—The proboscis response of insects, with special reference to blowflies. [7] 25: 241-244. **Dean, R. W.**—The alimentary canal of the apple maggot. Rhagoletis pomonella (Trypetidae). [7] 25: 210-223, ill. **deCoursey, R. M.**—The feeding habits of the first instar larvae of the cluster fly. [68] 75: 287. **Dickman, A.**—Studies on the intestinal flora of termites with reference to their ability to digest cellulose. [92] 61: 85-92. **Hering, M.**—Die bewegliche bursa copulatrix bei Eurycus cressida. [46] 24: 576-581, ill. **Heymons & von Lengerken.**—Studien über die lebenserscheinungen der Silphini. [46] 24: 259-287, ill. **Hosselet, C.**—Contribution a l'etude du Chondriome chez les insectes (Culicides et Phryganides). [Arch. Zool. Exp. et Gen., Paris] 72: 273 pp., ill. **Köhler, W.**—Die entwicklung der flügel bei der mehlmotte Ephestia kühniella, mit besonderer berücksichtigung des zeichnungsmusters. [46] 24: 582-681, ill. **Marcu, O.**—Beiträge zur kenntnis der stridulationsorgane der Curculioniden-gattungen Rhinoscapha, Homalonotus und Dionychus. [34] 97: 109-111, ill. **Merker, E.**—Die sichtbarkeit ultravioletten lichtes. [88] 20: 41-49, ill. **Metcalfe, M. E.**—The structure and development of the reproductive system in the Coleoptera with notes on its homologies. [53] 75: 49-129, ill. **Misra, A. B.**—On the internal anatomy of the male lac insect, Lacifer lacca (Coccidae). [93] 1931: 1359-1381, ill. **Shull, A. F.**—An internal but non-genetic character affecting wing production in response to light in an aphid. [90] 66: 180-183. **Sprung, F.**—Die flügeldecken der Carabidae. [46] 24: 435-490, ill. **Strasburger, M.**—Bau, funktion und variabilität des darmtractus von Drosophila melanogaster. [94] 140: 539-649, ill. **Sweetman, H. L.**—The effects of temperature and moisture on the distribution of the Mexican bean beetle, Epilachna corrupta. [7] 25: 224-240, ill. **Thomas, M.**—L'instinct et la psychologie des Guêpes prédatrices. [33] 71: 255-285. **Urban, F.**—Der lauf der entflügelten honigbiene (Apis mellifica) zum licht und der einfluss von eingriffen an receptoren, centralnervensystem und effectoren. [94] 140-355, ill. **Verlaine, L.**—L'instinct et l'intelligence chez les Orthoptères. L'autotomie psychique ou volontaire chez les Phasmides (Dixippus morosus). [Mem. Soc. R. Sci. Liége] 16: (18), 1-47. **Welsh, J. H.**—Specific influence of the host on the light responses of parasitic water mites. [92] 61: 497-499. **Whitehead, W.**

E.—The morphology of the head-capsule of some coleopterous larvae. [Canadian Jour. Res.] 6: 227-252, ill. **Whiting, P. W.**—Diploid male parts in gynandromorphs of Habrobracon. [92] 61: 478-484, ill. **Wigglesworth, V. B.**—On the function of the so-called "Rectal glands" of insects. [53] 75: 131-150, ill.

ARACHNIDA AND MYRIOPODA.—*Chamberlin, J. C.—On some false scorpions of the superfamily Cheiridioidea (Chelonethida). [55] 8: 137-144. **Chickering, A. M.**—Notes and studies on Arachnida. Araneae from the Douglas Lake Region, Michigan. [Pap. Michigan Acad. Sci. Arts & Letters] 15: 349-355. ***Finnegan, S.**—On a new species of mite of the family Heterozerconidae parasitic on a snake. (S). [93] 1931: 1349-1357, ill. **Jacot, A. P.**—Moss mites. [Bull. Boston Soc. Nat. Hist.] No. 63: 17-22, ill. **Kästner, A.**—Ueber die gliederung der Solifugae. [46] 24: 342-358, ill. **Petrunkevitch, A.**—Collecting Hypochilus. [6] 40: 19-23.

THE SMALLER ORDER OF INSECTS.—*Hood, J. D.—A new thrips from Plummer's Island, Maryland. [10] 34: 37-40, ill. **Münchburg, P.**—Beiträge zur kenntnis der biologie der Odonatenfamilie der Gomphidae. [46] 24: 704-735, ill. **Neave, F.**—The mayflies of Lake Winnipeg. [Canadian Field Nat.] 46: 54-55.

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SPECIAL NOTICES.—A systematic catalogue of Formosan Coleoptera. By Y. Miwa. [Rept. 55, Dept. Agric. Gov. Res. Inst., Formosa]. 359 pp., incl. index. In English except preface, with bibliography and bibliographical reference and synonymy of the species.

Die Rübenfliege (Pegomyia hyoscyami Pz.). Von Dr. H. Bremer und Dr. O. Kaufmann. Heft 7 of Monographien zum Pflanzenschutz. Julius Springer, Berlin, 1931. Price, R. M. 12. 100 pp., 32 fig. and charts. A very comprehensive booklet on the turnip-fly, giving in a very orderly and concise

manner what is known about this serious pest, with constant reference to the copious bibliography. The taxonomic history of the fly is briefly indicated in a rather extensive list of its synonyms and host plants. The authors then launch into its biology, successively taking up the embryological development, the effect of temperature on the habits of the larva and pupa, entering with considerable detail into the habits of the larval, pupal and adult stages and their sensitiveness to various influences. The important parasites and diseases of the several stages are mentioned, and their fluctuation during the severe epidemics of this pest in Europe. Finally its control through cultural methods, biologically and by direct chemical treatment is reviewed. Although really a review of the taxonomic, morphological, biological and economic literature of this pest, the whole is presented in such an orderly and concise manner, that it should prove a very valuable handbook to truck farmers, specializing in cabbage, beet and turnip culture.—E. T. Cresson, Jr.

OBITUARY.

Death of Mr. J. J. Joicey.

Editor, Entomological News:

I much regret to inform you of the unexpected death of Mr. J. J. Joicey at his Witley residence on March 10th. The work of the Hill Museum, Witley, Surrey, England, has in consequence to cease. G. Talbot.

Dr. Reginald Heber Howe died on January 28, 1932, as we learn from an obituary notice by Charles W. Johnson, accompanied by a portrait of Dr. Howe, in the *Bulletin of the Boston Society of Natural History*, No. 63, April, 1932. He was born in Quincy, Massachusetts, April 10, 1875, graduated from the Lawrence Scientific School of Harvard University in 1901, obtained a doctorate from the Sorbonne, Paris, in 1912, was connected with the Middlesex School, Concord, Massachusetts, until 1920, and head master of the Belmont Hill School from 1923 to his death. He published upon birds, lichens and dragonflies of New England, his papers on the last named group including a *Manual* of both adults and larvae and appearing in parts as a *Memoir of the Thoreau Museum of Natural History* (1917-1927). His collection of Odonata was given to the Boston Society of Natural History in 1930.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued.

Square, Pa.

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